IT 314

Software Engineering

Sprint 1 – User Controller Unit Testing

Fork & Feast

Group 28

➢ Tool Used:

Mocha @10.8.2
Chai @4.3.4
Other – Sinon @19.0.2

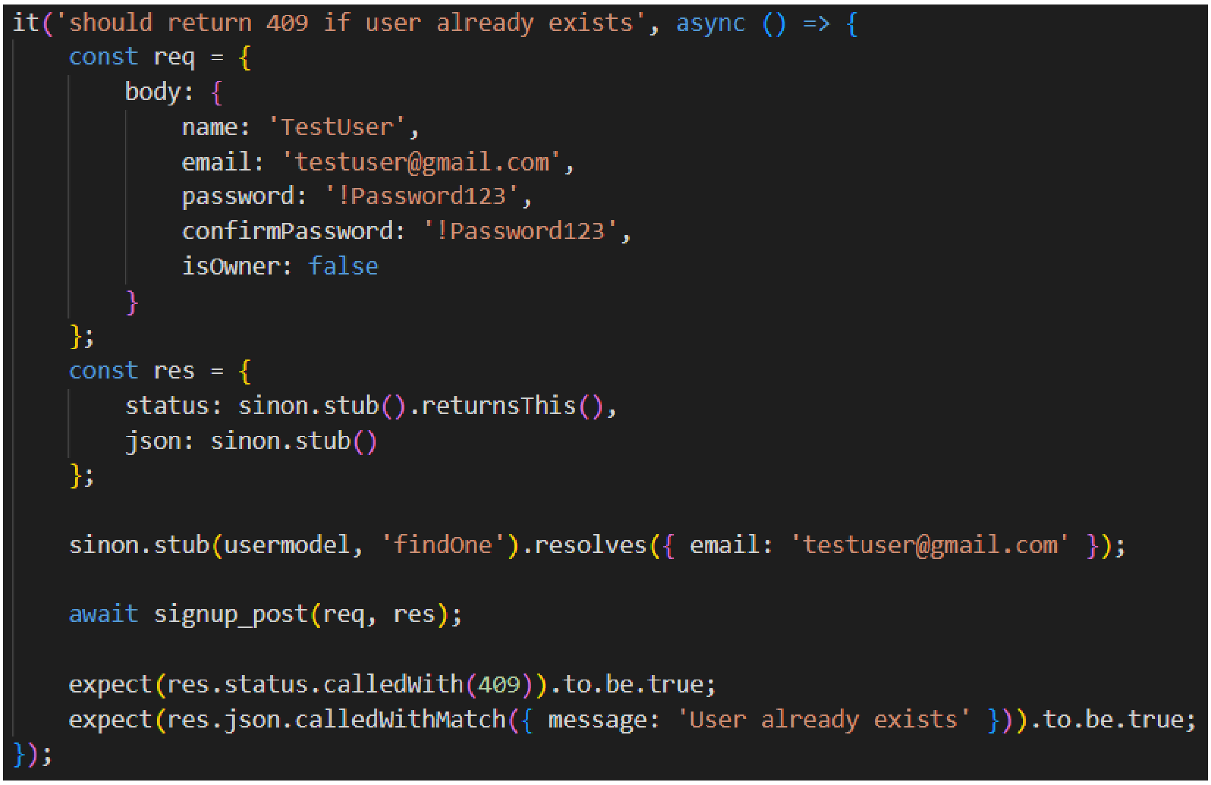
Link to the source code: userController

Link to the test file: userController_UT

1. signup_post:

This function takes care of the sign up functionality of the user like giving error in case the user is already signed in or in case of an invalid domain in the email field and so on.

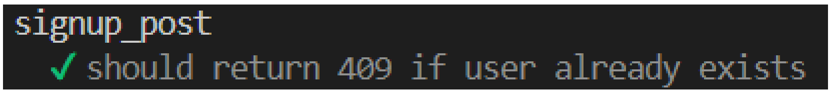
a) should return 409 if user already exists



```
it('should return 409 if user already exists', async () => {
    const req = {
        body: {
            name: 'TestUser',
            email: 'testuser@gmail.com',
            password: '!Password123',
            confirmPassword: '!Password123',
            isOwner: false
        }
    };
    const res = {
        status: sinon.stub().returnsThis(),
        json: sinon.stub()
    };

    sinon.stub(usermodel, 'findOne').resolves({ email: 'testuser@gmail.com' });

    await signup_post(req, res);

    expect(res.status.calledWith(409)).to.be.true;
    expect(res.json.calledWithMatch({ message: 'User already exists' })).to.be.true;
});
```

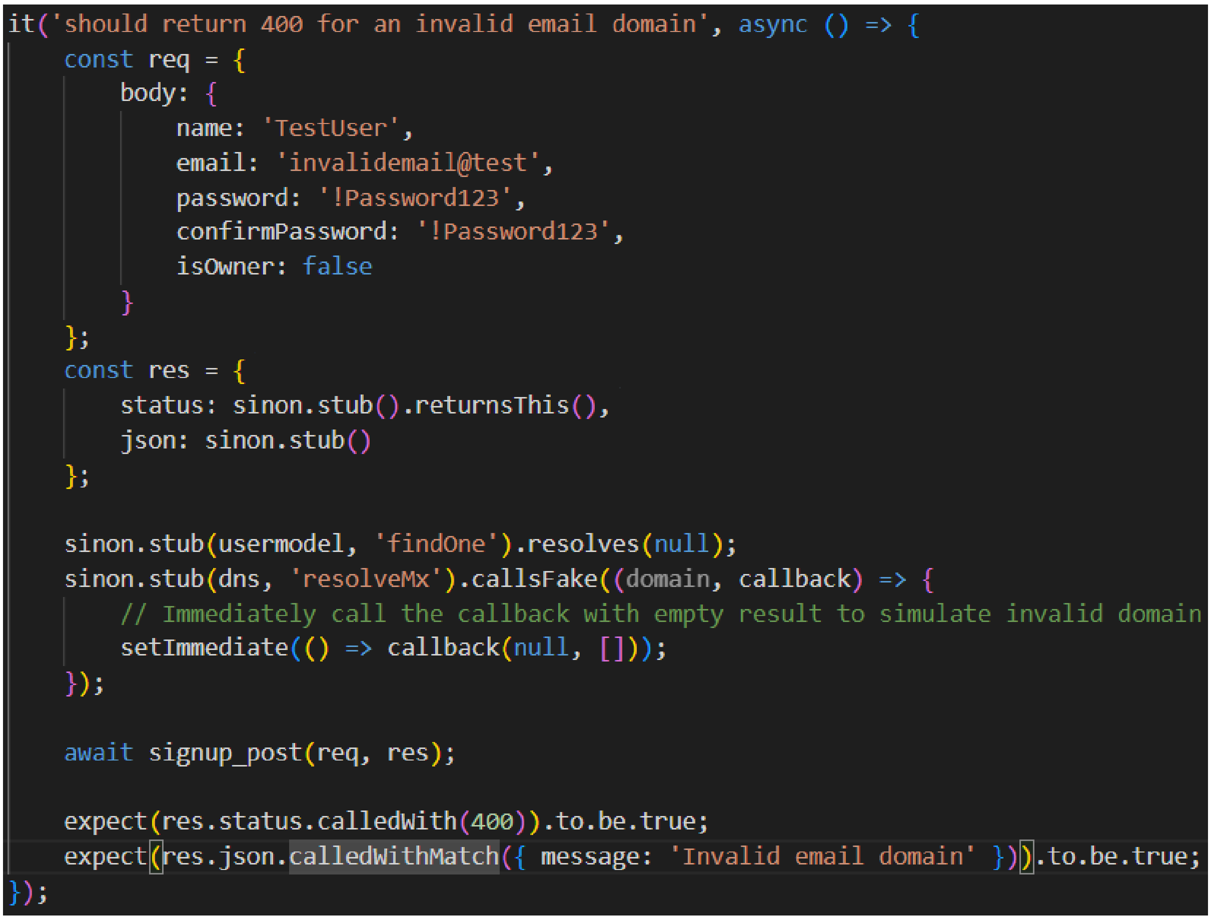
It sets up a mock request with user details and stubs the usermodel.findOne method to simulate an existing user. The res object is also mocked, and the function is called. The test asserts that res.status was called with 409 and res.json returns a message indicating the user already exists.

This test case is successfully covered which is confirmed with the result shown in the terminal as below:



```
signup_post
  ✓ should return 409 if user already exists
```

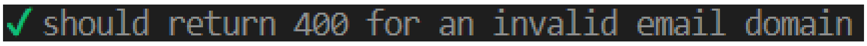
b) should return 400 for an invalid email domain



```
it('should return 400 for an invalid email domain', async () => {
    const req = {
        body: {
            name: 'TestUser',
            email: 'invalidemail@test',
            password: '!Password123',
            confirmPassword: '!Password123',
            isOwner: false
        }
    };
    const res = {
        status: sinon.stub().returnsThis(),
        json: sinon.stub()
    };

    sinon.stub(usermodel, 'findOne').resolves(null);
    sinon.stub(dns, 'resolveMx').callsFake((domain, callback) => {
        // Immediately call the callback with empty result to simulate invalid domain
        setImmediate(() => callback(null, []));
    });

    await signup_post(req, res);

    expect(res.status.calledWith(400)).to.be.true;
    expect(res.json.calledWithMatch({ message: 'Invalid email domain' })).to.be.true;
});
```

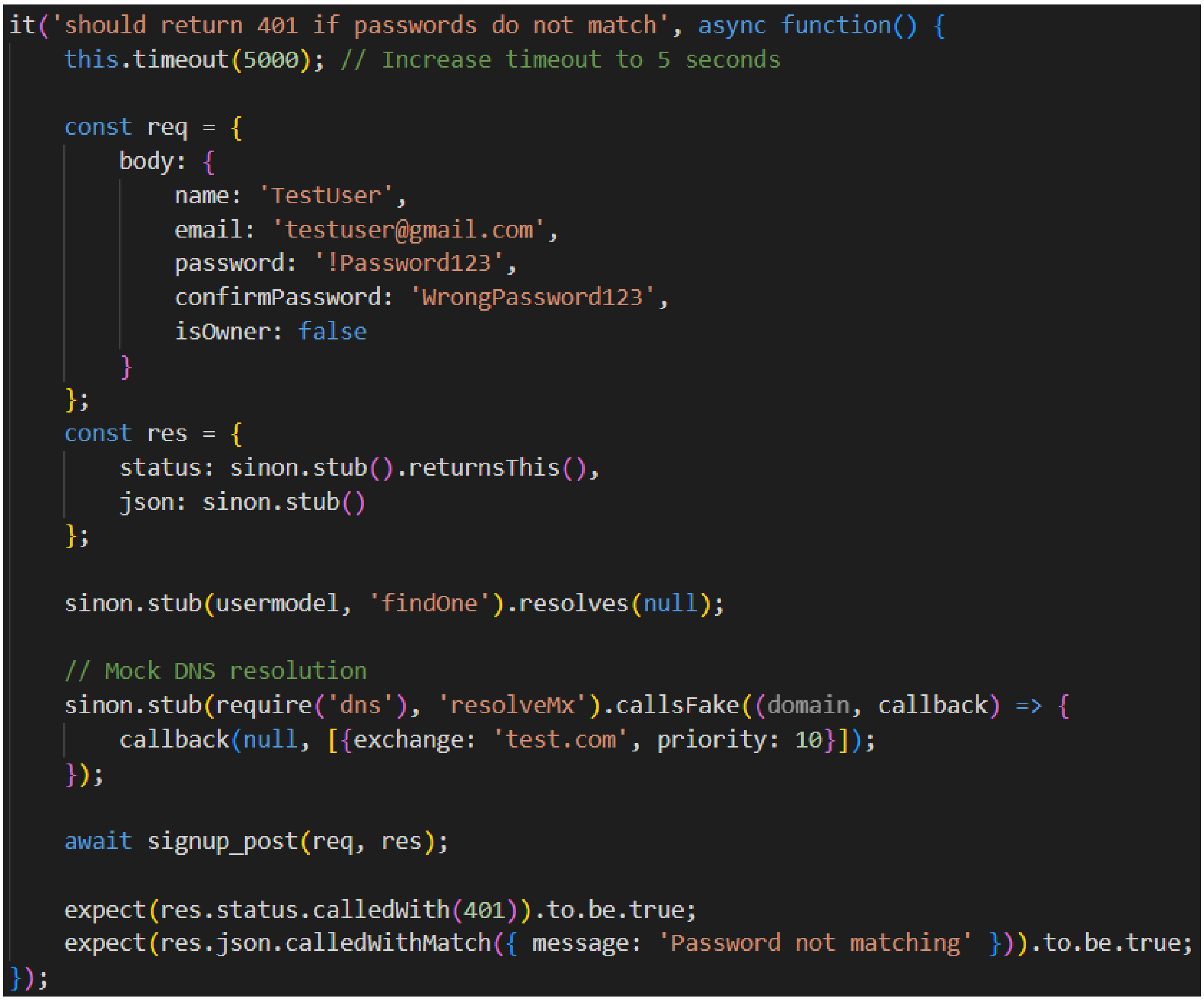
It sets up a mock request with user details that include an invalid domain and stubs the usermodel.findOne method to simulate no existing user. Additionally, it stubs dns.resolveMx to simulate an invalid domain by calling back with an empty result. The test asserts that res.status is called with 400 and res.json returns a message indicating an invalid email domain.

This test case is also covered:



```
✓ should return 400 for an invalid email domain
```

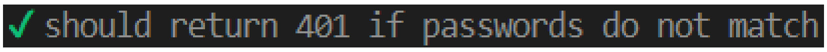
c) should return 401 if passwords do not match



```
it('should return 401 if passwords do not match', async function() {
    this.timeout(5000); // Increase timeout to 5 seconds

    const req = {
        body: {
            name: 'TestUser',
            email: 'testuser@gmail.com',
            password: '!Password123',
            confirmPassword: 'WrongPassword123',
            isOwner: false
        }
    };
    const res = {
        status: sinon.stub().returnsThis(),
        json: sinon.stub()
    };

    sinon.stub(usermodel, 'findOne').resolves(null);

    // Mock DNS resolution
    sinon.stub(require('dns'), 'resolveMx').callsFake((domain, callback) => {
        callback(null, [{exchange: 'test.com', priority: 10}]);
    });

    await signup_post(req, res);

    expect(res.status.calledWith(401)).to.be.true;
    expect(res.json.calledWithMatch({ message: 'Password not matching' })).to.be.true;
});
```

A mock request is set up with differing password and confirmPassword values. The usermodel.findOne method is stubbed to simulate no existing user, and dns.resolveMx is mocked to return a valid result, indicating a legitimate email domain. The test checks that res.status is called with 401 and res.json returns a message stating "Password not matching".

The result is:

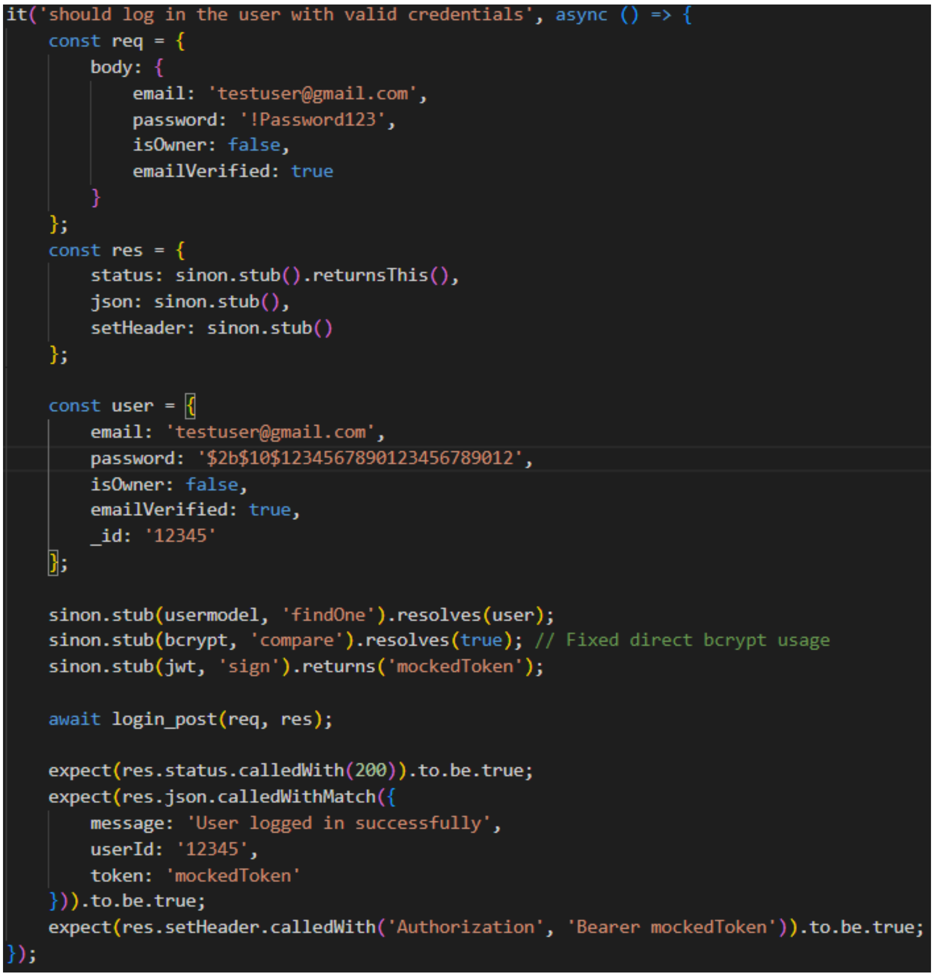


```
✓ should return 401 if passwords do not match
```

2. login_post:

This function takes care of the login test cases like login the user with valid credentials, return an error in case of wrong password or if a restaurant owner is trying to login as a user and so on.

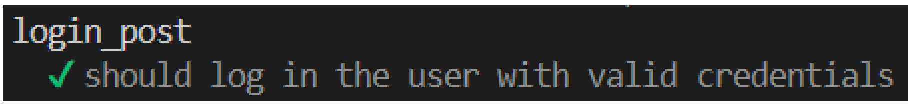
a) should log in the user with valid credentials



```
it('should log in the user with valid credentials', async () => {
    const req = {
        body: {
            email: 'testuser@gmail.com',
            password: '!Password123',
            isOwner: false,
            emailVerified: true
        }
    };
    const res = {
        status: sinon.stub().returnsThis(),
        json: sinon.stub(),
        setHeader: sinon.stub()
    };

    const user = {
        email: 'testuser@gmail.com',
        password: '$2b$10$1234567890123456789012',
        isOwner: false,
        emailVerified: true,
        _id: '12345'
    };

    sinon.stub(usermodel, 'findOne').resolves(user);
    sinon.stub(bcrypt, 'compare').resolves(true); // Fixed direct bcrypt usage
    sinon.stub(jwt, 'sign').returns('mockedToken');

    await login_post(req, res);

    expect(res.status.calledWith(200)).to.be.true;
    expect(res.json.calledWithMatch({
        message: 'User logged in successfully',
        userId: '12345',
        token: 'mockedToken'
    })).to.be.true;
    expect(res.setHeader.calledWith('Authorization', 'Bearer mockedToken')).to.be.true;
});
```

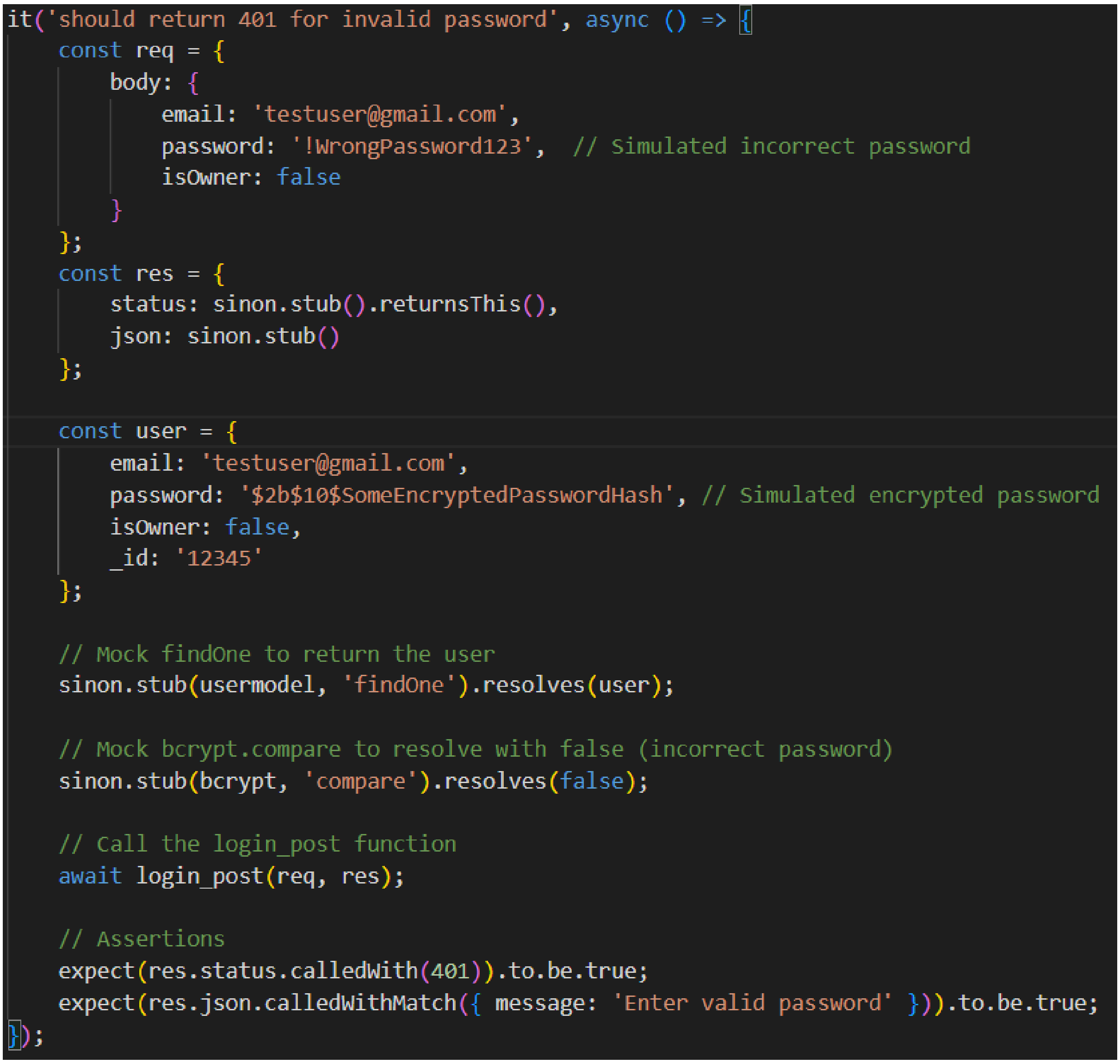
It sets up a mock request containing a valid email and password, and mocks the usermodel.findOne method to return a user object. Additionally, bcrypt.compare is stubbed to simulate a successful password match. The test then calls the login_post function and verifies that res.status is called with 200, res.json returns a success message, and res.setHeader sets the Authorization header to indicate a successful login.

This test case is also passed:



```
login_post
  ✓ should log in the user with valid credentials
```

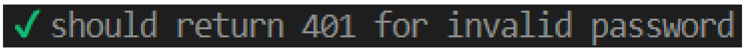
b) should return 401 for invalid password



```
it('should return 401 for invalid password', async () => {
    const req = {
        body: {
            email: 'testuser@gmail.com',
            password: '!WrongPassword123',  // Simulated incorrect password
            isOwner: false
        }
    };
    const res = {
        status: sinon.stub().returnsThis(),
        json: sinon.stub()
    };

    const user = {
        email: 'testuser@gmail.com',
        password: '$2b$10$SomeEncryptedPasswordHash', // Simulated encrypted password
        isOwner: false,
        _id: '12345'
    };

    // Mock findOne to return the user
    sinon.stub(usermodel, 'findOne').resolves(user);

    // Mock bcrypt.compare to resolve with false (incorrect password)
    sinon.stub(bcrypt, 'compare').resolves(false);

    // Call the login_post function
    await login_post(req, res);

    // Assertions
    expect(res.status.calledWith(401)).to.be.true;
    expect(res.json.calledWithMatch({ message: 'Enter valid password' })).to.be.true;
});
```

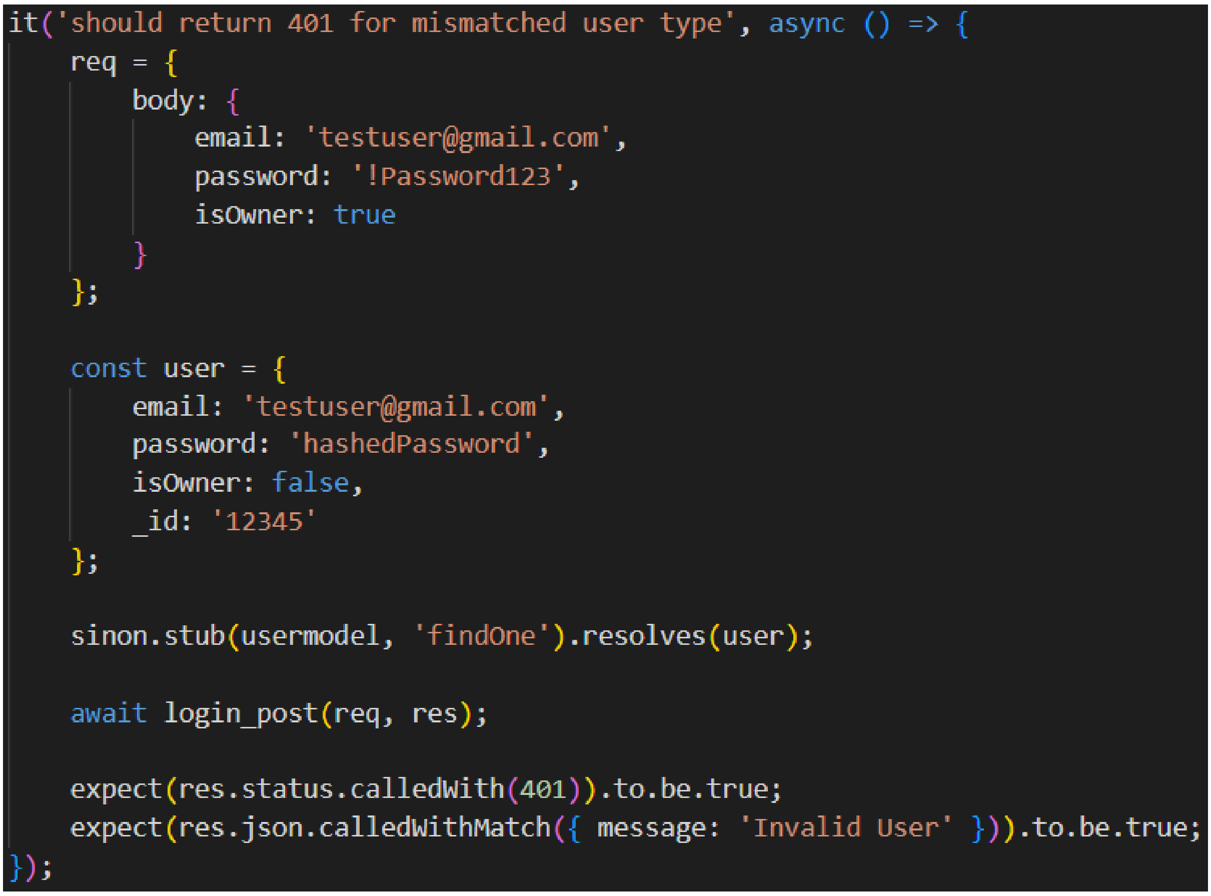
It creates a mock request with an email and an incorrect password, while usermodel.findOne is stubbed to return a user object with an encrypted password. The bcrypt.compare function is also stubbed to simulate a failed password match by resolving to false.

This is satisfied:



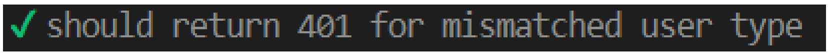
```
✓ should return 401 for invalid password
```

c) should return 401 for mismatched user type



```
it('should return 401 for mismatched user type', async () => {
    req = {
        body: {
            email: 'testuser@gmail.com',
            password: '!Password123',
            isOwner: true
        }
    };

    const user = {
        email: 'testuser@gmail.com',
        password: 'hashedPassword',
        isOwner: false,
        _id: '12345'
    };

    sinon.stub(usermodel, 'findOne').resolves(user);

    await login_post(req, res);

    expect(res.status.calledWith(401)).to.be.true;
    expect(res.json.calledWithMatch({ message: 'Invalid User' })).to.be.true;
});
```

It mocks a request with the isOwner field set to true, while the user in the database has isOwner: false. The usermodel.findOne method is stubbed to return this user. The test then calls login_post and verifies that res.status is called with 401, and res.json returns a message indicating "Invalid User."



```
✓ should return 401 for mismatched user type
```

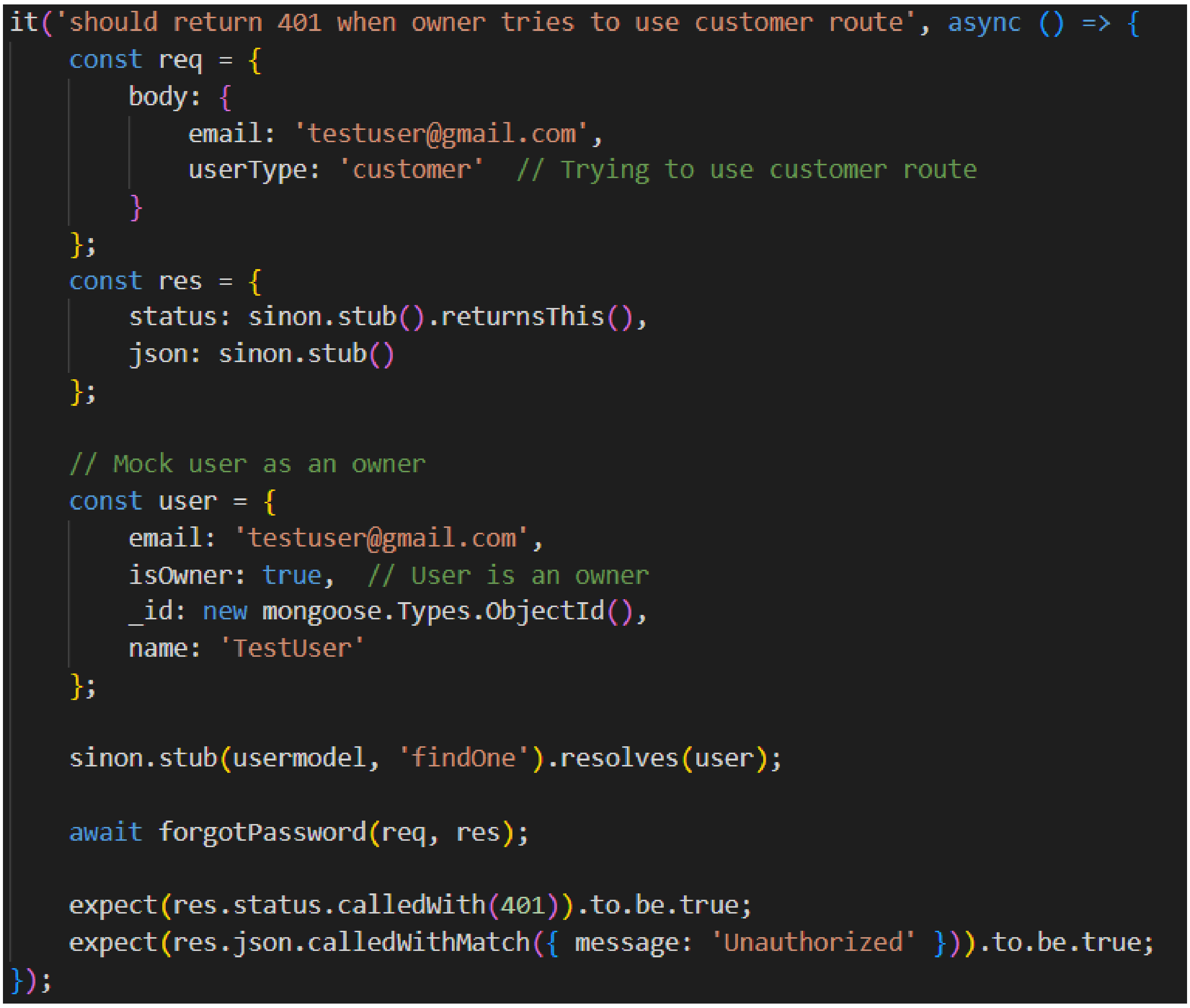
d) should return 401 for invalid password

This is same as in signup_post.

3. forgotPassword:

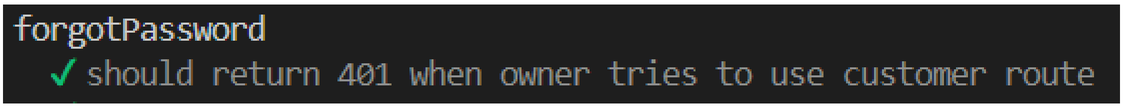
   This function takes in the email for which password needs to be reset and checks if it is valid and that it is not registered as restaurant owner.

   a) should return 401 when owner tries to use customer route



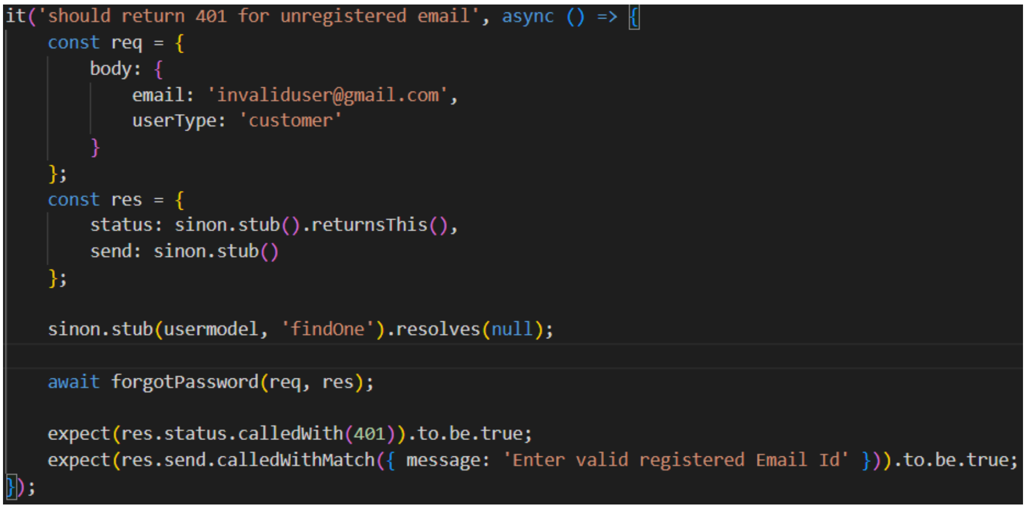
```
it('should return 401 when owner tries to use customer route', async () => {
    const req = {
        body: {
            email: 'testuser@gmail.com',
            userType: 'customer'  // Trying to use customer route
        }
    };
    const res = {
        status: sinon.stub().returnsThis(),
        json: sinon.stub()
    };

    // Mock user as an owner
    const user = {
        email: 'testuser@gmail.com',
        isOwner: true,  // User is an owner
        _id: new mongoose.Types.ObjectId(),
        name: 'TestUser'
    };

    sinon.stub(usermodel, 'findOne').resolves(user);

    await forgotPassword(req, res);

    expect(res.status.calledWith(401)).to.be.true;
    expect(res.json.calledWithMatch({ message: 'Unauthorized' })).to.be.true;
});
```

It sets up a mock request where the user is trying to use a "customer" route, but the user in the database is an owner (isOwner: true). The usermodel.findOne method is stubbed to return the owner user. The test then calls the forgotPassword function and verifies that res.status is called with 401 and res.json returns a message indicating "Unauthorized."



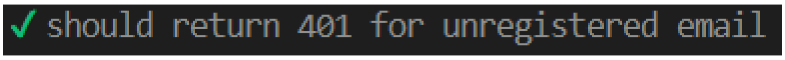
```
forgotPassword
  ✓ should return 401 when owner tries to use customer route
```

b) should return 401 for unregistered email



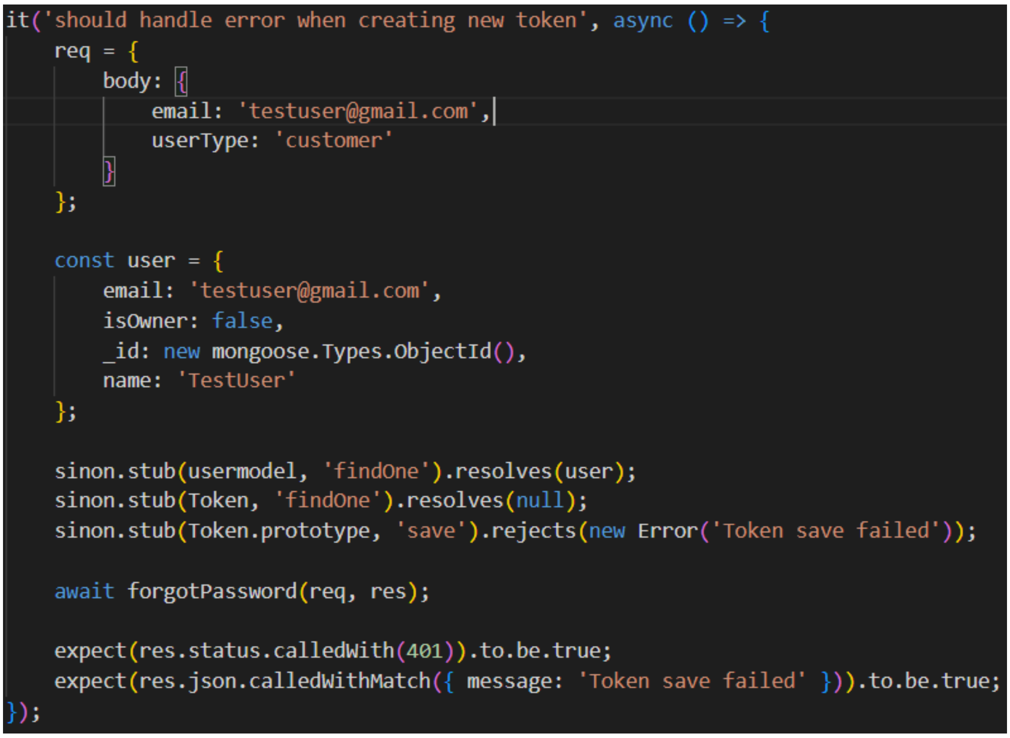
```
it('should return 401 for unregistered email', async () => {
    const req = {
        body: {
            email: 'invaliduser@gmail.com',
            userType: 'customer'
        }
    };
    const res = {
        status: sinon.stub().returnsThis(),
        send: sinon.stub()
    };

    sinon.stub(usermodel, 'findOne').resolves(null);

    await forgotPassword(req, res);

    expect(res.status.calledWith(401)).to.be.true;
    expect(res.send.calledWithMatch({ message: 'Enter valid registered Email Id' })).to.be.true;
});
```

It sets up a mock request with an email (invaliduser@gmail.com) that doesn't exist in the database. The usermodel.findOne method is stubbed to return null, indicating the email is unregistered. The test then calls forgotPassword and checks that res.status is called with 401 and res.send returns a message stating "Enter valid registered Email Id," confirming the system handles unregistered emails correctly.



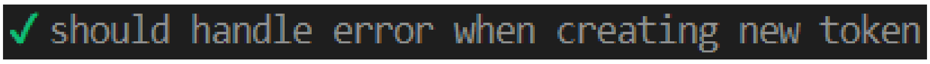
```
✓ should return 401 for unregistered email
```

c) should handle error when creating a new token



```
it('should handle error when creating new token', async () => {
    req = {
        body: {
            email: 'testuser@gmail.com',
            userType: 'customer'
        }
    };

    const user = {
        email: 'testuser@gmail.com',
        isOwner: false,
        _id: new mongoose.Types.ObjectId(),
        name: 'TestUser'
    };

    sinon.stub(usermodel, 'findOne').resolves(user);
    sinon.stub(Token, 'findOne').resolves(null);
    sinon.stub(Token.prototype, 'save').rejects(new Error('Token save failed'));

    await forgotPassword(req, res);

    expect(res.status.calledWith(401)).to.be.true;
    expect(res.json.calledWithMatch({ message: 'Token save failed' })).to.be.true;
});
```

It mocks the database queries to find the user and the token, and forces the Token.prototype.save method to throw an error. The test expects the function to handle the error by returning a 401 status and a JSON response with the error message Token save failed.

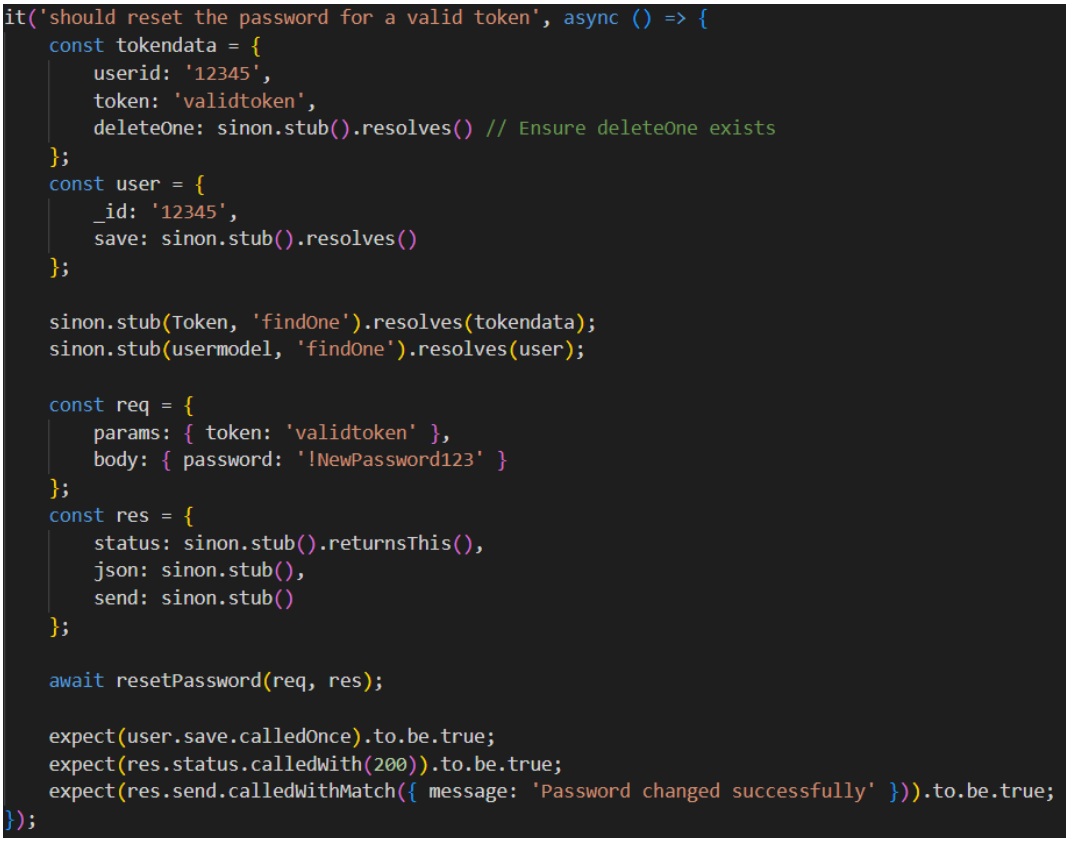


```
✓ should handle error when creating new token
```

4. resetPassword:

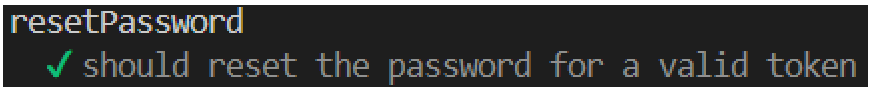
   The resetPassword function handles password resets by verifying an existing user, it then ensures a password is provided, then updates the user's password. If any step fails, it returns appropriate error messages.

   a) should reset the password for a valid token



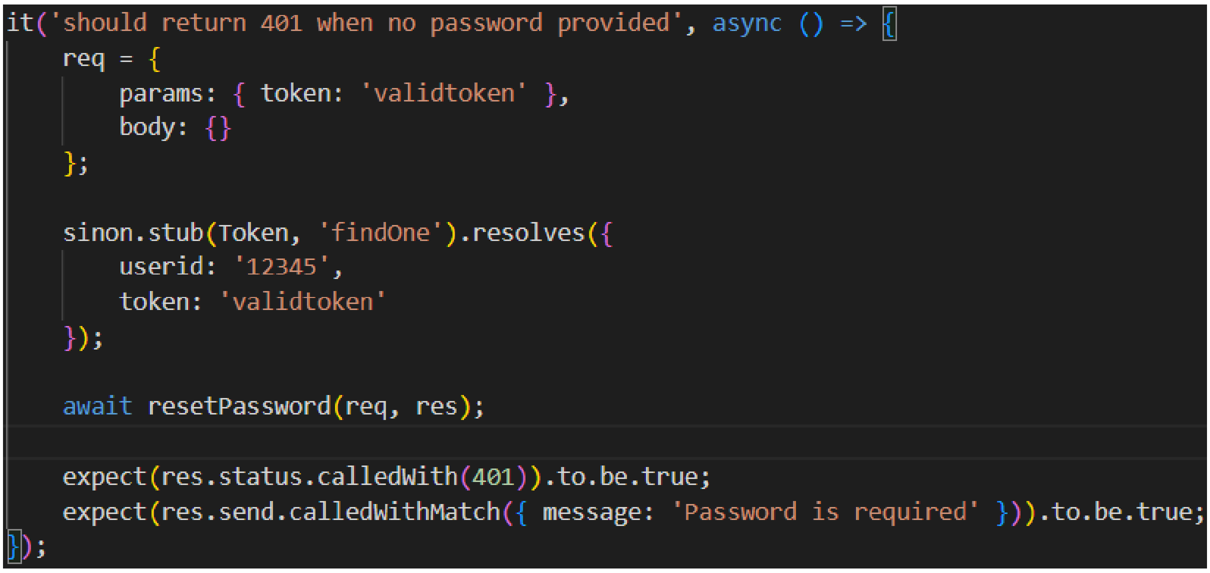
```
it('should reset the password for a valid token', async () => {
    const tokendata = {
        userid: '12345',
        token: 'validtoken',
        deleteOne: sinon.stub().resolves() // Ensure deleteOne exists
    };
    const user = {
        _id: '12345',
        save: sinon.stub().resolves()
    };

    sinon.stub(Token, 'findOne').resolves(tokendata);
    sinon.stub(usermodel, 'findOne').resolves(user);

    const req = {
        params: { token: 'validtoken' },
        body: { password: '!NewPassword123' }
    };
    const res = {
        status: sinon.stub().returnsThis(),
        json: sinon.stub(),
        send: sinon.stub()
    };

    await resetPassword(req, res);

    expect(user.save.calledOnce).to.be.true;
    expect(res.status.calledWith(200)).to.be.true;
    expect(res.send.calledWithMatch({ message: 'Password changed successfully' })).to.be.true;
});
```

The test checks that the password is updated (via user.save()), the response status is 200, and the correct success message ("Password changed successfully") is returned. The test also ensures the deleteOne method is called to remove the token after the password reset.



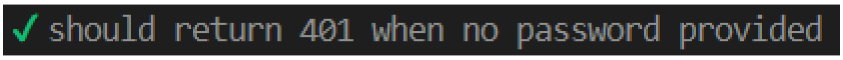
```
resetPassword
  ✓ should reset the password for a valid token
```

b) should return 401 when no password provided



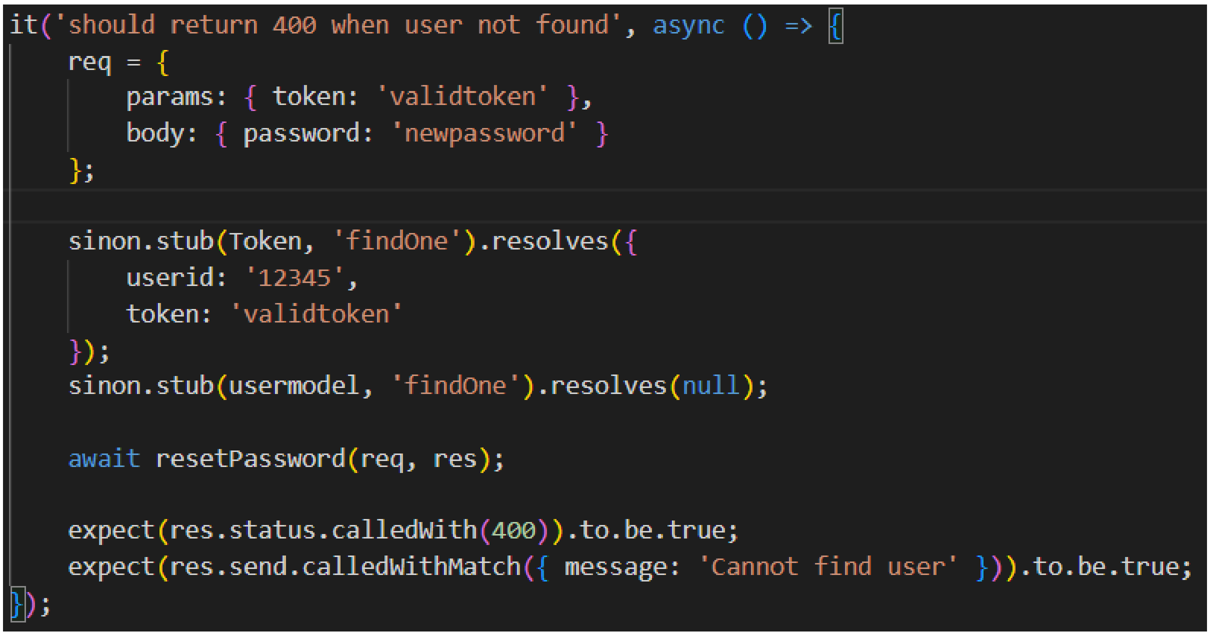
```
it('should return 401 when no password provided', async () => {
    req = {
        params: { token: 'validtoken' },
        body: {}
    };

    sinon.stub(Token, 'findOne').resolves({
        userid: '12345',
        token: 'validtoken'
    });

    await resetPassword(req, res);

    expect(res.status.calledWith(401)).to.be.true;
    expect(res.send.calledWithMatch({ message: 'Password is required' })).to.be.true;
});
```

It mocks the token data to simulate a valid token and user association. Since the password field is missing in the request body, the test checks that the function correctly responds with a 401 status and the message "Password is required."



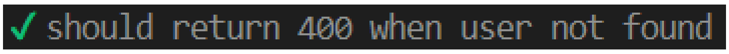
```
✓ should return 401 when no password provided
```

c) should return 400 when user not found



```
it('should return 400 when user not found', async () => {
    req = {
        params: { token: 'validtoken' },
        body: { password: 'newpassword' }
    };

    sinon.stub(Token, 'findOne').resolves({
        userid: '12345',
        token: 'validtoken'
    });
    sinon.stub(usermodel, 'findOne').resolves(null);

    await resetPassword(req, res);

    expect(res.status.calledWith(400)).to.be.true;
    expect(res.send.calledWithMatch({ message: 'Cannot find user' })).to.be.true;
});
```

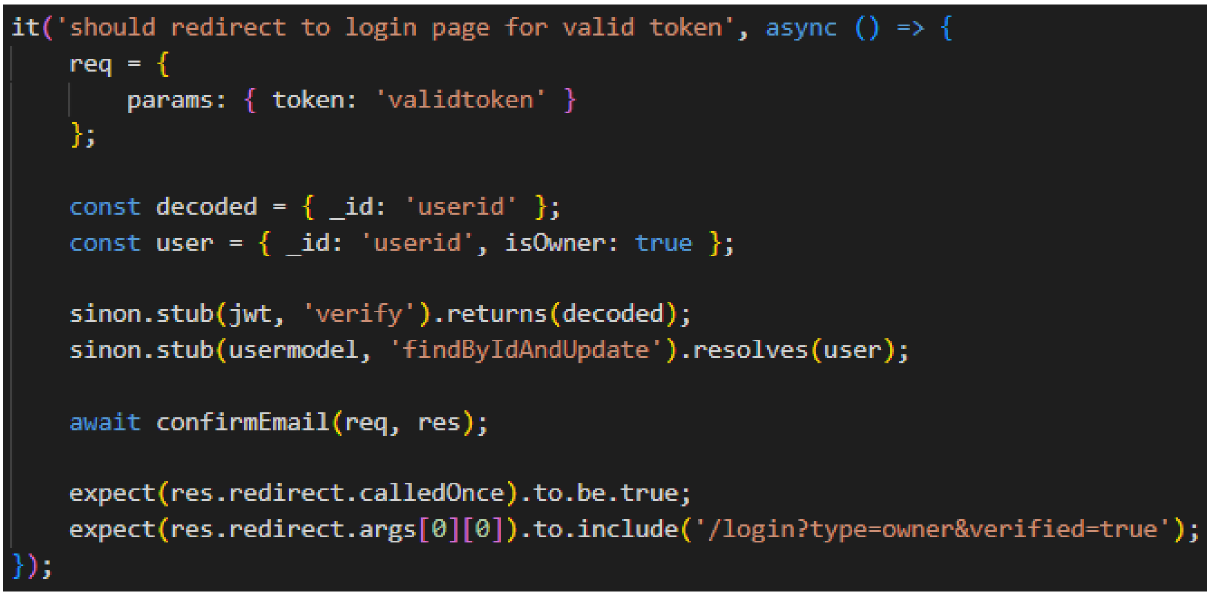
It mocks a valid token, but simulates a scenario where the user lookup (usermodel.findOne) returns null, indicating no matching user. The test checks that the function responds with a 400 status and the message "Cannot find user."



```
✓ should return 400 when user not found
```

5. confirmEmail:
   This function redirects the user to the login site as he clicks on the confirm email button in the mail.

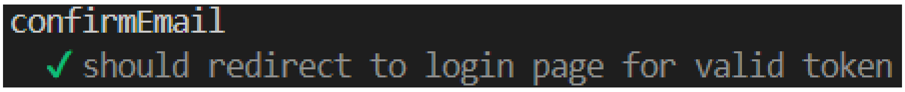
   a) should redirect to login page for valid token



```
it('should redirect to login page for valid token', async () => {
    req = {
        params: { token: 'validtoken' }
    };

    const decoded = { _id: 'userid' };
    const user = { _id: 'userid', isOwner: true };

    sinon.stub(jwt, 'verify').returns(decoded);
    sinon.stub(usermodel, 'findByIdAndUpdate').resolves(user);

    await confirmEmail(req, res);

    expect(res.redirect.calledOnce).to.be.true;
    expect(res.redirect.args[0][0]).to.include('/login?type=owner&verified=true');
});
```

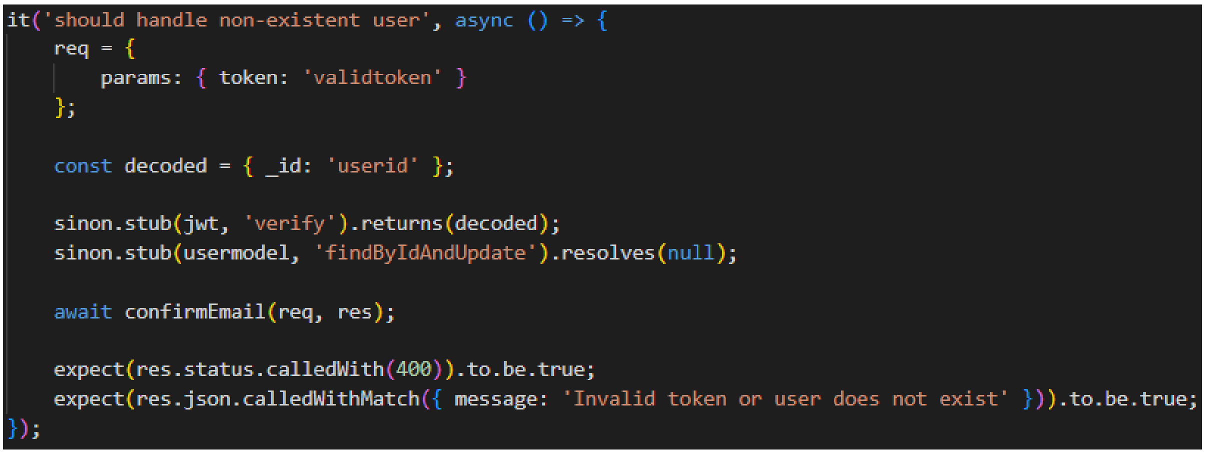
It mocks the jwt.verify method to simulate successful token decoding and returns the decoded user ID. It also mocks usermodel.findOne to simulate finding a user who is an owner (isOwner: true). The test verifies that the res.redirect method is called once and that the URL includes the query parameter ?type=owner, indicating the user type is an owner.

And for a customer (isOwner: false) and the query parameter ?type=customer.



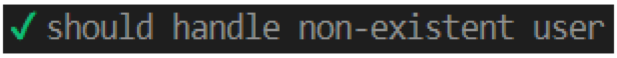
```
confirmEmail
  ✓ should redirect to login page for valid token
```

b) should handle non-existent user



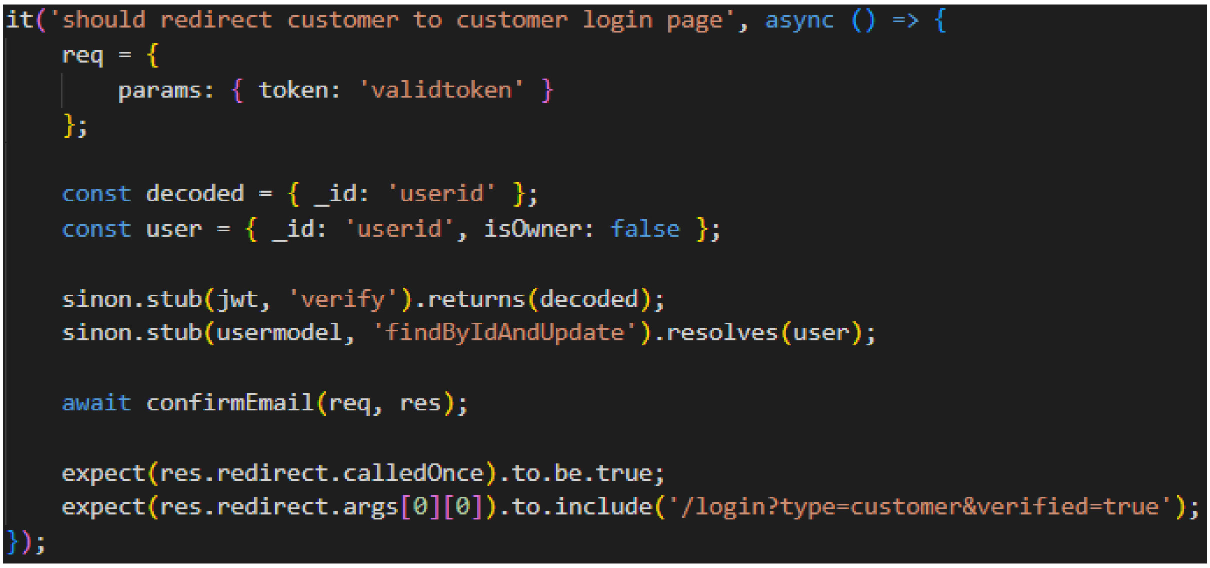
```
it('should handle non-existent user', async () => {
    req = {
        params: { token: 'validtoken' }
    };

    const decoded = { _id: 'userid' };

    sinon.stub(jwt, 'verify').returns(decoded);
    sinon.stub(usermodel, 'findByIdAndUpdate').resolves(null);

    await confirmEmail(req, res);

    expect(res.status.calledWith(400)).to.be.true;
    expect(res.json.calledWithMatch({ message: 'Invalid token or user does not exist' })).to.be.true;
});
```

Here the usermodel.findOne is stubbed to return null, indicating that no user is found for that ID. The test checks that the function responds with a 400 status and the appropriate error message, "Invalid token or user does not exist".



```
✓ should handle non-existent user
```

c) should redirect customer to customer login page



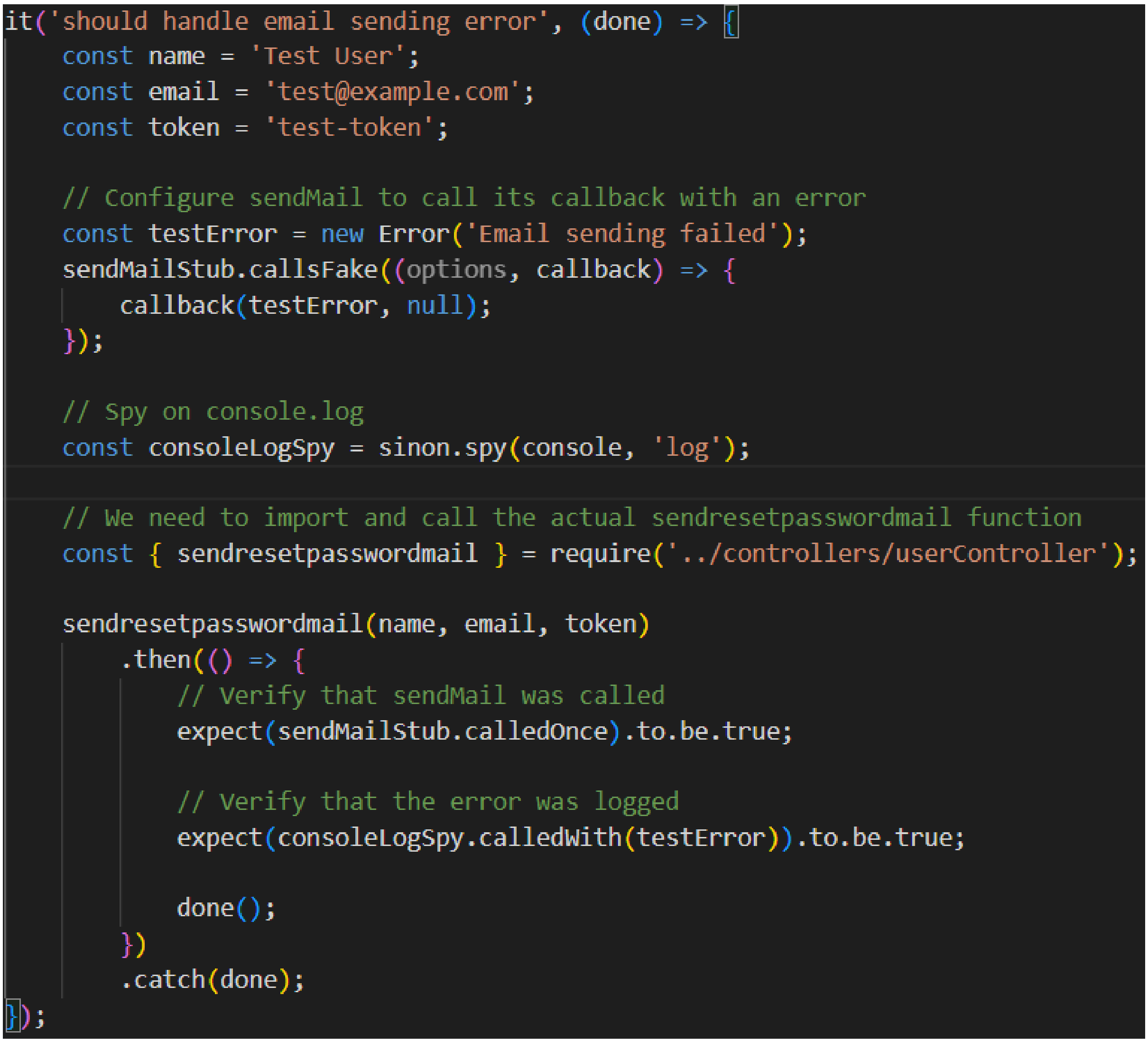
```
it('should redirect customer to customer login page', async () => {
    req = {
        params: { token: 'validtoken' }
    };

    const decoded = { _id: 'userid' };
    const user = { _id: 'userid', isOwner: false };

    sinon.stub(jwt, 'verify').returns(decoded);
    sinon.stub(usermodel, 'findByIdAndUpdate').resolves(user);

    await confirmEmail(req, res);

    expect(res.redirect.calledOnce).to.be.true;
    expect(res.redirect.args[0][0]).to.include('/login?type=customer&verified=true');
});
```

The usermodel.findOne is stubbed to return a user with isOwner: false, indicating they are a customer. The test verifies that the res.redirect method is called once and the redirect URL includes the query parameter ?type=customer, ensuring the user is redirected to the correct login page.

```
✓ should redirect customer to customer login page
```

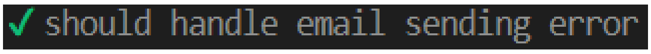
6. sendresetpasswordmail:
   This is the function which sends the mail to reset password with a link to the reset password page.

a) should handle email sending error



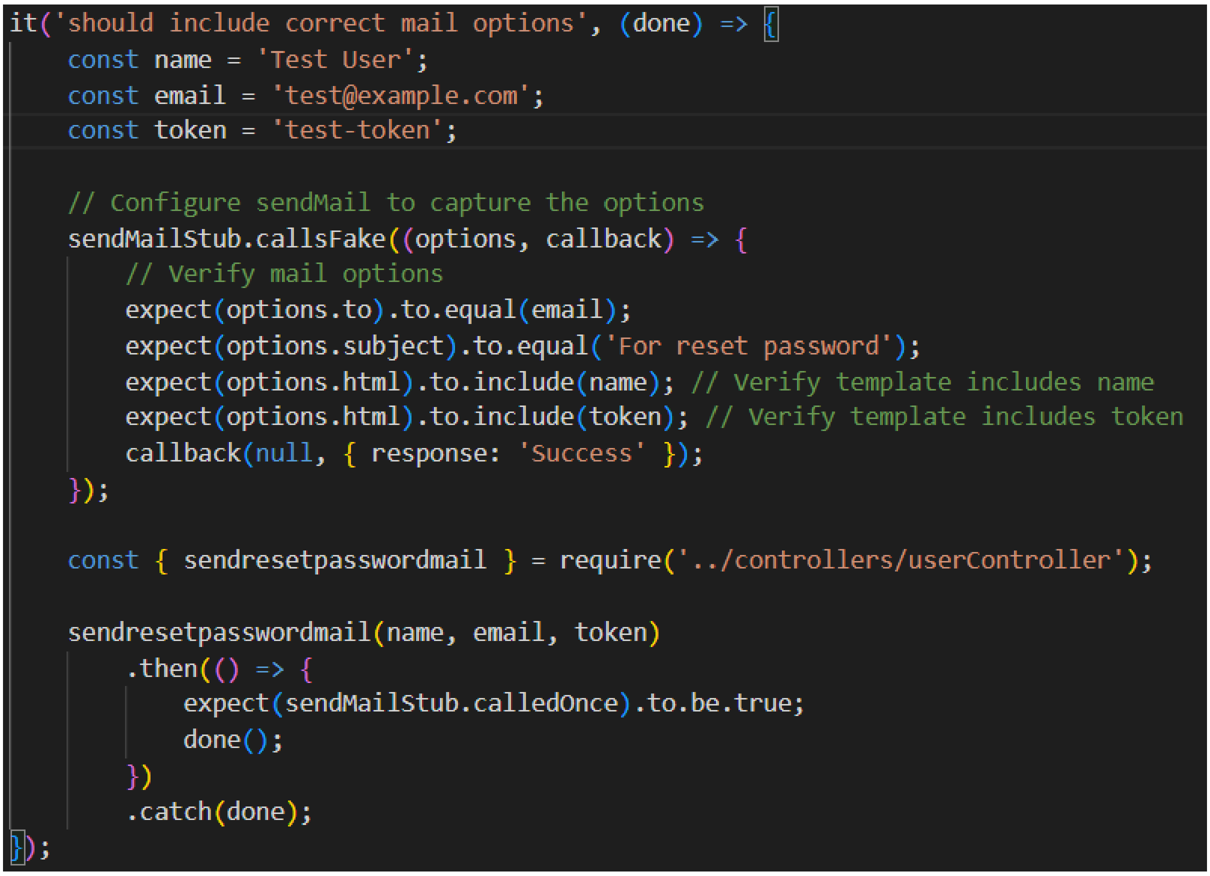
```
it('should handle email sending error', (done) => {
    const name = 'Test User';
    const email = 'test@example.com';
    const token = 'test-token';

    // Configure sendMail to call its callback with an error
    const testError = new Error('Email sending failed');
    sendMailStub.callsFake((options, callback) => {
        callback(testError, null);
    });

    // Spy on console.log
    const consoleLogSpy = sinon.spy(console, 'log');

    // We need to import and call the actual sendresetpasswordmail function
    const { sendresetpasswordmail } = require('../controllers/userController');

    sendresetpasswordmail(name, email, token)
        .then(() => {
            // Verify that sendMail was called
            expect(sendMailStub.calledOnce).to.be.true;

            // Verify that the error was logged
            expect(consoleLogSpy.calledWith(testError)).to.be.true;

            done();
        })
        .catch(done);
});
```

It simulates an error in the sendMail function and checks if the error is logged using console.log. The test verifies that sendMail was called once, and the error message is logged to the console, confirming proper error handling in the email sending process.



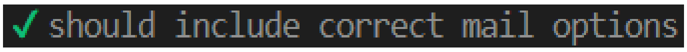
```
✓ should handle email sending error
```

b) should include correct mail options



```
it('should include correct mail options', (done) => {
    const name = 'Test User';
    const email = 'test@example.com';
    const token = 'test-token';

    // Configure sendMail to capture the options
    sendMailStub.callsFake((options, callback) => {
        // Verify mail options
        expect(options.to).to.equal(email);
        expect(options.subject).to.equal('For reset password');
        expect(options.html).to.include(name); // Verify template includes name
        expect(options.html).to.include(token); // Verify template includes token
        callback(null, { response: 'Success' });
    });

    const { sendresetpasswordmail } = require('../controllers/userController');

    sendresetpasswordmail(name, email, token)
        .then(() => {
            expect(sendMailStub.calledOnce).to.be.true;
            done();
        })
        .catch(done);
});
```

It mocks the sendMail function to capture and check the email options, ensuring the recipient's email, subject, and HTML content include the user's name and token. The test also ensures that sendMail is called once, confirming the correct email options are passed. If everything matches, the test finishes successfully by calling done().

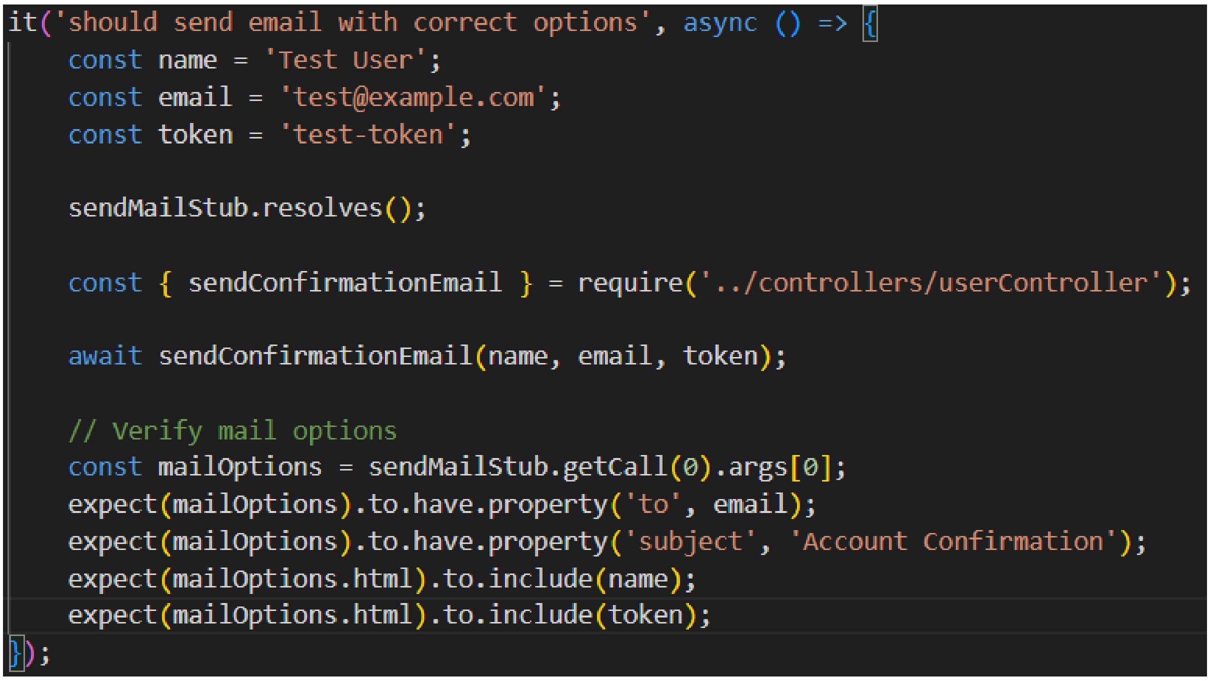


```
✓ should include correct mail options
```

7. sendConfirmationEmail

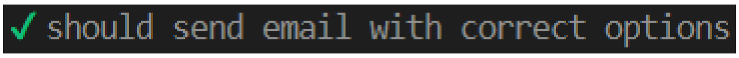
   This is the function responsible for sending the mail to confirm email at the time of sign up with a link to the login page.

   a) should send email with correct options



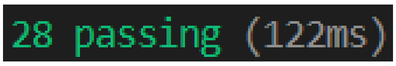
```
it('should send email with correct options', async () => {
    const name = 'Test User';
    const email = 'test@example.com';
    const token = 'test-token';

    sendMailStub.resolves();

    const { sendConfirmationEmail } = require('../controllers/userController');

    await sendConfirmationEmail(name, email, token);

    // Verify mail options
    const mailOptions = sendMailStub.getCall(0).args[0];
    expect(mailOptions).to.have.property('to', email);
    expect(mailOptions).to.have.property('subject', 'Account Confirmation');
    expect(mailOptions.html).to.include(name);
    expect(mailOptions.html).to.include(token);
});
```

Similar to the resetpasswordmail.



```
✓ should send email with correct options
```

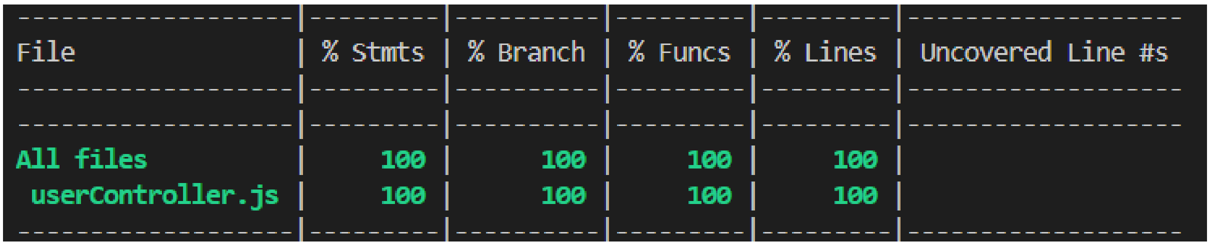
At last it showed us that all our test cases were passed.



```
28 passing (122ms)
```

➢ Coverage Report

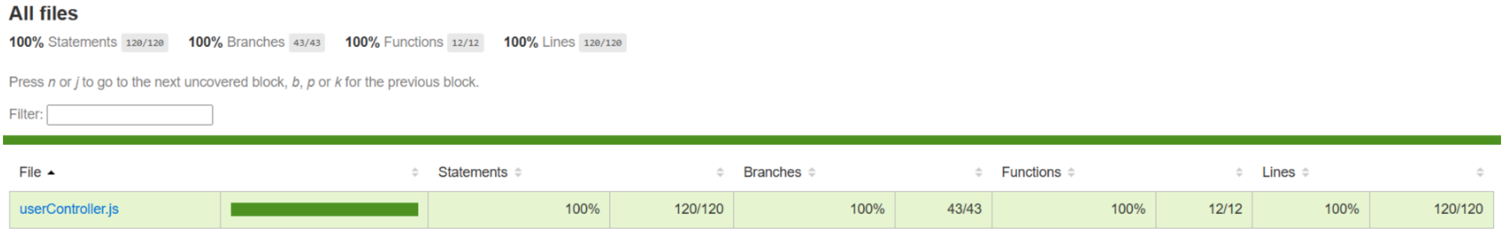
For this we used the “nyc --reporter=text” command which gave us the following output:



```
--------------------|---------|----------|---------|---------|-------------------
File                | % Stmts | % Branch | % Funcs | % Lines | Uncovered Line #s
--------------------|---------|----------|---------|---------|-------------------
--------------------|---------|----------|---------|---------|-------------------
All files           |     100 |      100 |     100 |     100 |
 userController.js  |     100 |      100 |     100 |     100 |
--------------------|---------|----------|---------|---------|-------------------
```

Showing that 100% statements, branches and functions were covered in the unit testing.

For in depth report we used “nyc --reporter=lcov” which gave us an html file highlighting the number of times a particular line ran during the entire testing.



All files

100% Statements 120/120 **100%** Branches 43/43 **100%** Functions 12/12 **100%** Lines 120/120

Press *n* or *j* to go to the next uncovered block, *b*, *p* or *k* for the previous block.

Filter:

File ▲		Statements		Branches		Functions		Lines	
userController.js		100%	120/120	100%	43/43	100%	12/12	100%	120/120

Link to the HTML file: Coverage Report